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THE KENT INCORPORATED SOCIETY
FOR PROMOTING EXPERIMENTS IN
HORTICULTURE

SUPPLEMENTARY
ANNUAL REPORT

(THIRTY-FIFTH YEAR)

GENERAL DEVELOPMENT AND ACTIVITIES

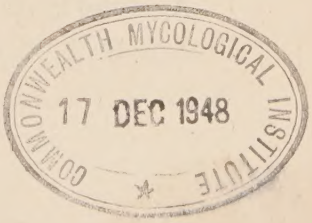
EAST MALLING RESEARCH STATION

Near MAIDSTONE

KENT

1st January, 1947, to 31st December, 1947

Published June, 1948



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Professor F. T. BROOKS, C.B.E., M.A., F.R.S., Botany School, Cambridge.

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Appointed by East Malling Research Station:

R. G. HATTON, Esq., C.B.E., M.A.(Oxon.), D.Sc.(Lond.), V.M.H., F.R.S.

Appointed by the Staff Council of East Malling Research Station:

W. S. ROGERS, Esq., M.A.(Cantab.), D.Sc.(Lond.), Dip.Hort.(Cantab.), A.Inst.P. (*Appointed April*, 1947.)
H. SHAW, Esq., M.Sc.Tech., Ph.D.(Manc). (*Resigned April*, 1947.)

MEMBERS OF THE EXECUTIVE COMMITTEE

(Governing Members elected at the General Meeting, September, 1945)

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E. U. Bloor, Esq.
Professor F. T. Brooks, C.B.E., M.A., F.R.S.
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J. W. S. Mount, Esq.
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Professor T. Wallace, C.B.E., M.C., D.Sc., A.I.C.
Captain R. Wellington, M.C.

The Director:

R. G. Hatton, Esq., C.B.E., M.A.(Oxon.), D.Sc.(Lond.), V.M.H., F.R.S.

The Representative of the Staff Council:

W. S. Rogers, Esq., M.A.(Cantab.), D.Sc.(Lond.), Dip.Hort.(Cantab.), A.Inst.P.

Co-opted Members:

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H. V. Taylor, Esq., O.B.E., D.Sc.(Lond.), A.R.C.S., Ministry of Agriculture.

STAFF

(JANUARY, 1948)

Director: RONALD G. HATTON,* C.B.E., M.A.(Oxon.), D.Sc.(Lond.), V.M.H., F.R.S.

Assistant to Director: T. N. HOBLYN,* Hort.Dip.(Wye).

E. E. CHEESMAN, D.Sc.(Lond.), A.R.C.S.

Pomology:

R. G. HATTON.*
W. S. ROGERS,* M.A.(Cantab.), D.Sc.(Lond.), Dip.Hort.(Cantab.), A.Inst.P.
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D. W. P. GREENHAM, M.A.(Cantab.).
H. M. TYDEMAN, *Plant Breeding.*
A. P. PRESTON, N.D.H.
Miss E. M. GLENN, B.Sc.(Lond.), *Field Records.*
Miss E. C. THOMPSON.
Miss B. G. MOSSE, B.Sc.(Lond.), Dip.Hort.(Swanley),† *Histological Investigations.*
Miss I. MODLIBOWSKA, Ph.D.(Lond.).
Miss J. M. PATON, Hort.Dip.(E. of Scotland), *Field Records.*
Miss M. H. E. DAVIES, B.Sc.(Lond.).† (*Appointed October*, 1947.)
Miss C. P. NICOLL, B.Sc.Hort.(Reading). (*Appointed October*, 1947.)

Laboratory and Field Assistants:

Miss F. BACON.
Miss E. C. M. ASHDOWN.
F. J. BELLINGHAM. (*Resigned November*, 1947.)
A. J. RUTTER. (*Appointed November*, 1947.)
Miss F. M. HODGES.
Mrs. O. WENBOURNE (*née* ROBINSON).
Miss D. E. A. YATES.

Hops:

F. H. BEARD, Hort.Dip.(Wye).
Miss D. J. WILSON, B.Sc.Hort.(Reading),† *Hop Propagation.*

Statistics:

T. N. HOBLYN.*
S. C. PEARCE, B.Sc.(Lond.).
J. TAYLOR, M.A.(Cantab.).
Miss J. M. S. THOM.

Plant Physiology: M. C. VYVYAN,* M.A.(Cantab.), D.Sc.(Lond.).
Miss M. R. RAWES.

* Recognized Teacher of the University of London.
† Appointed under special grant from Agricultural Research Council.

Laboratory Assistants :

G. F. TROWELL. (*Returned from Active Service, March,* 1947.)
A. G. LLOYD. (*Resigned, February,* 1947.)
G. R. EVANS. (*Appointed, April,* 1947.)

Members of Staff of the Imperial College of Science and Technology working in collaboration with Physiology Section :

E. S. J. HATCHER, Ph.D.(Bristol).
H. W. B. BARLOW, B.Sc.(Edin.).
C. L. MER, Ph.D.(Lond.), A.R.C.S., D.I.C. (*Transferred, April,* 1947.)

Laboratory Assistant : J. LARKING. (*Appointed, January,* 1947.)

Biochemistry:

W. A. ROACH,* D.Sc.(Lond.), A.R.C.S., D.I.C., A.R.I.C.
S. G. THOMPSON, M.C., M.A.(Oxon.).
A. C. MASON, B.Sc.(Lond.), F.R.I.C., *Physical Chemist.*
F. H. VANSTONE, Ph.D.(Wales), A.Inst.P., *Physicist.*
Miss A. V. DELAP, B.A., B.Sc.(Dublin).

Special Assistant : Miss M. E. BUNYARD, A.R.R.C.

Laboratory Assistants :

Miss D. F. E. MARTIN.
Mrs. C. KING.
Miss B. M. KIDWELL.
Miss M. SAUNDERS.
R. NEVE.
E. C. WILLS. (*Appointed, December,* 1947.)

Members of the Staff of the Imperial College of Science and Technology working in collaboration with the Biochemistry Section :

B. D. BOLAS,* D.Sc.(Lond.), D.I.C.
G. B. PORTSMOUTH, B.Sc.(Lond.), A.R.C.S., D.I.C.

Laboratory Assistants :

Miss C. C. MACNAMARA.
Miss B. MILTON. (*Appointed, February,* 1947.)

Plant Pathology:

R. V. HARRIS,* D.Sc.(Lond.), A.R.C.S., D.I.C.
M. H. MOORE, M.Sc., Dip.Hort.Sci.(Reading), *Plant Pathologist.*
W. G. KEYWORTH, Ph.D.(Lond.), A.R.C.S., D.I.C., *Plant Pathologist.*
I. W. PRENTICE, Ph.D.(Glasgow), *Virologist.*
P. C. R. WEBB, M.Sc.(Lond.), *Mycologist and Bacteriologist.*
J. PAINE, B.Sc.(Lond.), A.R.C.S., *Virologist.* (*Appointed, November,* 1947.)
Miss M. BENNETT, B.Sc.Hort.(Lond.), Dip.Hort.(Swanley), *Field Trials ; also attached Entomology and Plant Protective Chemistry.*
Miss M. M. HITCHCOCK, B.Sc.Hort.(Reading).
Miss J. L. SMITH, B.Sc.(Glasgow).
D. S. KIRKHAM, B.Sc.(Lond.), *Bioassay of Fungicides, attached to Plant Protective Chemistry.*
Miss T. WOOLCOMBE, B.Sc.Hort.(Reading).† (*Appointed, May,* 1947.)

Laboratory Assistants :

R. D. SOUTER. (*Returned from Active Service, January,* 1948)
Miss B. I. FLEET.
Miss M. M. JOYCE.
Miss F. J. NEWING. (*Resigned, March,* 1947.)
Miss S. SQUIRES. (*Appointed, April,* 1947.)

Entomology:

A. M. MASSEE,* D.Sc.(Lond.), F.R.E.S.
G. H. L. DICKER, Ph.D.(Lond.), A.R.C.S.
M. D. AUSTIN, F.R.E.S., (*Red Spider Investigations in Essex.*)
R. G. DAVIES, M.Sc.(Lond.), *Bioassay of Insecticides, attached to Plant Protective Chemistry.*
R. S. PITCHER, B.Sc.Agric.(Lond.),† *Raspberry Cane Midge Investigation.*
Miss E. COLLYER, B.Sc.(Lond.),† (*Red Spider Investigations in Essex.*)
Miss J. R. GROVES, B.Sc.(Reading). (*Appointed, December,* 1947.)
F. CRONK.

Laboratory Assistants :

E. F. SOUTER. (*Returned from Active Service, January,* 1948.)
J. LUCAS. (*Resigned, May,* 1947.)

Plant Protective Chemistry: H. SHAW, M.Sc.Tech., Ph.D.(Manc.), F.R.I.C. (*Resigned, April,* 1947.)
J. K. EATON, B.Sc.(Wales), M.Sc.Tech.(Manc.), Ph.D.(Lond.), A.R.I.C.
R. G. GAMBRILL.
J. T. GREAVES, B.A.(Oxon.). (*Resigned, June,* 1947.)
L. J. PULESTON. (*Appointed, October,* 1947.)

For Biological Assistants, see D. S. KIRKHAM, *Plant Pathology and* R. G. DAVIES, *Entomology Sections.*

Laboratory Assistants :

S. P. SIMMONDS. (*Resigned, February,* 1947.)
Miss V. M. DREW.
Miss J. M. STEVENS. (*Appointed, September,* 1947.)

Scottish Raspberry Investigation: *Headquarters—University College, Dundee.*
R. V. HARRIS,* *Head of Investigations.*
C. H. CADMAN, B.Sc.(Liv.), Ph.D.(Edin.),† *Plant Pathologist.* (*In charge.*)
C. A. WOOD, Ph.D.(Wales),† *Pomologist.*
A. R. HILL, B.Sc.(St. Andrews),† *Entomologist.*
R. J. ROSE.† (*Appointed, February,* 1947.)

Field and Laboratory Assistants :

Miss E. C. REOCH.† (*Resigned, June,* 1947.)
J. P. VALENTINE.† (*Resigned, April,* 1947.)
H. A. BISSETT.† (*Appointed, April,* 1947.)
R. W. REID.† (*Appointed, May,* 1947.)

Technical Section: H. B. S. MONTGOMERY, B.A.(Dublin), Ph.D.(Lond.), D.I.C. *Scientific Liaison Officer.*
A. C. PAINTER, O.B.E.
B. F. G. LEVY, B.A.(Cantab.), Ph.D.(Lond.), Hort.Cert.(Reading).

Laboratory Assistant :

Miss M. M. ACOTT. (*Appointed, April,* 1947.)

Instructress in Fruit growing to the Kent Education Committee stationed at East Malling Research Station: Miss L. R. E. MARTIN, B.Sc.Hort.(Lond.), N.D.H., Hort.Dip.(Studley).

Meteorological Records: A. P. PRESTON.

Librarian: S. R. BALL, B.A.(Lond.), F.L.A.

Photographer: E. YOXALL JONES. (*Appointed, August,* 1947.)

Assistant Photographer: W. F. BOND. (*Resigned, June,* 1947.)

FARM STAFF.

Farm Supervisor: F. H. VILLIERS, M.Sc.Agric.(Reading), N.D.A.

Assistant Plantations Officer: Miss B. F. SEYMOUR.

Experimental Nurseries: D. H. HAMMOND. (*Resigned, March,* 1947.)
T. V. DIXON. (*Appointed, February,* 1947.)

Experimental Greenhouses: A. TIDY.
Miss E. K. JOYCE.
K. MILLS. (*Appointed, April,* 1947.)

Workshops: G. WELLER.
C. H. W. SLATER, *Laboratory Instrument Mechanic.*

Farm Clerk: A. J. SPILLER.

ADMINISTRATION.

Secretary: C. T. ROYLE, M.C.

Book-keeper: P. R. WOOD.

Director's Personal Secretary: Miss L. M. READ.

Clerical Staff: Miss J. M. COY, Miss M. E. EMM, Miss U. M. CARAMAN, Miss J. D. MARTIN, Miss J. M. PARSONS, Miss L. SHERRATT (*Appointed, March,* 1947), Miss M. G. ARNUP, Miss D. G. HUME (*Appointed, May,* 1947), Miss P. M. RAYFIELD, Miss R. M. WICKHAM, Miss I. CROSS, Mrs. F. J. FITNESS (*Appointed, May,* 1947), Miss A. V. JELL (*Appointed, December,* 1947).

VISITORS.

Visits may be paid by appointment on any day from Monday to Friday.

All visitors wishing to see the work of the Station should go to the Enquiry Office at the Research Laboratories. *It is most important that an appointment be made beforehand.*

Visitors coming by road should take the turning to East Malling, opposite "The Bull", Larkfield, on the main London-Maidstone road. The entrance gate to the Research Station is on the left, opposite the "King and Queen" in East Malling.

Bus Service: From Maidstone by the Maidstone and District Motor Services Limited, every 20 minutes from Maidstone to East Malling.

Passenger Station: EAST MALLING HALT (Southern Railway).

Goods Station: AYLESFORD (Southern Railway).

Correspondence: All correspondence should be addressed to the East Malling Research Station, near Maidstone, Kent.

Telephone: Aylesford 7294 (2 lines). *Telegrams:* Research, East Malling.

THE COMMONWEALTH* BUREAU OF HORTICULTURE AND PLANTATION CROPS

Accommodated at Bradbourne, the Administrative Headquarters of the East Malling Research Station.

STAFF.

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Consultant Director: RONALD G. HATTON, C.B.E., M.A.(Oxon.), D.Sc.(Lond.), V.M.H., F.R.S.

Assistant Director: A. G. G. HILL, B.A., Agr.B.(Dublin), B.Sc.,(N.U.I.), A.R.C.Sc.(I). (*Appointed, June,* 1947.)

Assistants: V. H. GOLDSCHMIDT, Ph.D.
H. WORMALD, D.Sc.(Lond.), A.R.C.S., D.I.C.
G. K. G. CAMPBELL, B.Sc.(St. Andrews), A.I.C.T.A. (*Appointed, July,* 1947.)

Clerical Staff: Miss M. B. ROGERS, Miss M. M. DURLING, Miss M. A. CROUCHER.

* as from 1.1.48.

NATIONAL AGRICULTURAL ADVISORY SERVICE

Accommodated at Bradbourne, the Administrative Headquarters of the East Malling Research Station.

Telephone: Aylesford 7278.

Fruit Specialist Officer, South Eastern Province: W. G. KENT, N.D.H.

Clerical Assistant: Miss J. COWELL.

GENERAL DEVELOPMENT AND ACTIVITIES

INTRODUCTORY.

In presenting this Thirty-fifth Supplementary Report, the Committee would like to draw particular attention to the progress that has been made in drawing up and beginning work on the Station's post-war research programme. The rapid growth of the Staff was alluded to last year and, as we write, we can report that the number of scientific and experimental officers, including those from the Imperial College of Science, has reached sixty. During the first three months of the year a series of discussions was held at which each Section in turn gave its programme of work. This provided an admirable opportunity for many who have been appointed since the war to obtain a knowledge of the work of the Station as a whole. Also, as so many of our projects are essentially collaborative, the frank interchange of ideas was especially useful. On the morning of the Annual General Meeting a special attempt was made to give Governing Members an insight into some of the work in progress. In future it is hoped to set aside a whole day each year so that our Governing Body may obtain a closer view of the research than has previously been possible. The Committee hope they will take full advantage of this day and not hesitate to put forward any criticisms or suggestions about the work they are shown.

The problems of administering our large research staff and its ancillary workers in the laboratories, the offices and on the farm are still many and various. The progress that has been made towards their solution is detailed in the various sections of this report. Staff housing and laboratory accommodation are still the most pressing.

The year 1947 will long be remembered for its meteorological records. However, we can again report heavy crops of most kinds of fruit and the farm management is to be congratulated on bringing these safely to harvest despite the vagaries of the weather. As a consequence there is again a substantial credit balance on the Farm account, which will be handed over to the Ministry as a contribution to the Research Block Grant.

A year has now passed since the formation of the East Malling Association, when the privileges of membership were drastically revised and the subscription raised. It is a source of great satisfaction to the Committee that our numbers are again rapidly approaching 2,000 and are still increasing.

OBITUARY.

It is with regret that we record, on going to press, the sudden death of Mr. R. J. Burrell of Bury St. Edmunds, who had been a Life Founder of the Research Station for many years. Mr. Burrell had always taken a great personal interest in the work and welfare of the Research Station and had been a most generous supporter.

GOVERNING MEMBERS.

Two Governing Members have been honoured by H.M. The King; Mr. F. A. Secrett was made a Commander of the Order of the British Empire in June, 1947, and Mr. William Alexander, a Member of the Order of the British Empire in December, 1947.

Mr. J. E. Sandall, who was one of the original representatives appointed by the Central Headquarters of the N.F.U., has now retired. The Committee would like to record their sincere thanks for his eleven years' valuable service on the Governing Body. Mr. E. U. Bloor was appointed in his place and a welcome is extended to him.

Dr. H. Shaw, the representative of the Staff Council, resigned in April, 1947, to take up an appointment as Director of the Wattle Research Station in Pietermaritzburg, South Africa. Dr. W. S. Rogers was elected to represent the Staff Council in his place.

The Research and Advisory Committee at Wye College has now been re-formed, and a welcome is extended to Professor H. W. Miles who has been nominated as their representative.

The Committee would like to place on record their congratulations and best wishes to a former Governing Member, Mr. William Rogers of Horton Kirby, who attained his 90th birthday in 1947.

COMMITTEES.

The *Executive Committee* and *Finance Sub-Committee* (Chairman, Mr. T. Neame) held their usual four quarterly meetings. In addition the following Sub-Committees have met to deal with particular matters: *Staff Accommodation* (Chairman, Mr. J. F. Towner), in March and June; *Postgraduate and Staff* (Chairman, Professor V. H. Blackman) in November; *Farming* (Chairman, Mr. T. Neame) in February; and *Plant Prices* (Chairman, Mr. W. Talbot Edmonds) in July.

Owing to Dr. Hatton's enforced absence from the Station through illness in the autumn, the Committee appointed Mr. T. N. Hoblyn Acting Director. They hope to welcome back Dr. Hatton, fully restored to health, in the near future.

Apart from the routine business of the Station the following were the more important subjects dealt with.

Housing Accommodation.

With the occupation early in 1948 of the additional four farm cottages on the site adjoining Bradbourne Park Farm, the programme for housing members of our farm staff will be completed, at any rate for the time being. The Committee would remind Members that the twelve cottages have been built out of the accumulated surplus receipts from the Experimental Farm without the assistance of Government Grants, and this is a very satisfactory achievement.

The Grange hostel is now a going concern and has already proved a great help in meeting the needs of single members of the research staff and long-term postgraduate students.

Little progress, however, was possible during 1947 towards the solution of the urgent problem of finding accommodation for married members of the research staff. The cost of alterations and redecoration of the Maidstone property, Fowden Hall, was found to be excessive, while we were unable to obtain possession of the adjoining house, Montcalm, still occupied by the K.C.A.E.C. Feeding Stuffs Department. The Committee therefore decided, with the approval of the Trustees of the Development Fund, that both Fowden Hall and Montcalm should be leased to the Ministry of Works, and negotiations to that end are in progress. In December, it was decided to approach the Ministry for a capital grant and the necessary support in obtaining permits to erect eight houses on the estate for members of research staff. The Committee sincerely hope that it will be possible to complete the formalities and lay the foundations of these houses during the coming year.

Laboratory and Canteen Accommodation.

The rapid growth of the research staff has been referred to several times in recent Reports. Now the point has been reached where, without further laboratory bench

space, new appointments cannot be made. Further, the staff canteen has proved so popular that the old staff dining room in the E.M.B. building can no longer accommodate all those who wish to use it. New laboratory buildings are, unfortunately, out of the question for some time to come, so to meet immediate needs, plans are in preparation, with the provisional approval of the Ministry, for the erection of a prefabricated building for use as a staff canteen. The rooms thus released in the E.M.B. building will be adapted to give additional laboratory accommodation for the use of all Sections as needed.

Greenhouses.

The short-term plans detailed last year for the extension of greenhouse accommodation having been approved by the Ministry, considerable progress has been made. By the end of the year the four Chase " Dedutchable " houses for virus work had been erected, while the insectaries for the Entomology Section and the prefabricated potting shed were in course of building. Plans were also ready for work to be started on the rebuilding of the old orchard house. All these buildings should be ready for use in the coming season.

Other Buildings.

A beginning had been made on the repainting of all research, farm and other buildings on the estate. It is hoped to complete the work during 1948.

A new 3 in. water main to the research laboratories has been laid, which it is hoped will overcome the difficulty of maintaining an adequate supply.

The conversion to electrically heated boilers in the N.F.U. and Manwaring buildings has been completed, to the advantage of the work of the Biochemistry Section previously handicapped by coke fumes.

Staff Salaries.

Progress has at last been made in the assimilation of the research staff into the new salary grades, though this was by no means completed by the end of the year. Recommendations have gone forward for the assimilation of laboratory assistants into the new Assistants (Scientific) Grades. The Committee, however, deplore the fact that no progress has yet been made in the revision of the salaries of the administrative staff, and have repeatedly urged the Ministry to accelerate matters. They sincerely hope that all the salary revisions will be completed during 1948.

Staff Council.

Following on the regrading of the whole of the research staff, it has been necessary to revise the constitution of the Staff Council. After some discussion an appropriate revision has been agreed on and will be brought into effect in the coming year.

Distribution of Experimental Material.

The H. T. A. agreed this year to undertake themselves the allocation of material reserved for their members. The Committee must again emphasise that in future much smaller quantities of material will be available for distribution. Members are recommended to make their enquiries for material to any of the raisers of certified fruit plants, a list of which can be obtained on application to The Secretary, Ministry of Agriculture and Fisheries, Government Buildings, Block C, Lytham St. Annes, Lancs.

Experimental Farm.

Permits have been obtained for the necessary piping to extend the water supply to the new apple plantations on Church Fields and Larkfield Plantation. It is hoped that part at any rate of this work will be completed in time for the 1948 spraying season. Additional farm implements, including a new Ferguson tractor, have been purchased.

THE ANNUAL GENERAL MEETING.

The Annual General Meeting was held at the administrative headquarters, Bradbourne House, Larkfield, on Friday, 3rd October, 1947, under the Chairmanship of Mr. T. Neame.

A special programme had been organized for the Governing Members during the morning. The various research sections showed some of the new lines of work that were developing and invited criticisms and suggestions. The programme proved popular and similar days in the future should serve to keep Members in close touch with the research programme.

At the Annual General Meeting in the afternoon, the Chairman referred to the absence of the Director, Dr. R. G. Hatton, and reported that he was making satisfactory progress; wishes for a speedy return were sent from the Meeting.

The Assistant to the Director, Mr. T. N. Hoblyn, presented the Supplementary Annual Report and the Annual Report, and gave a general review of the programme of work during 1946. Mr. G. E. Tuker, moving the adoption of the Report, referred to the tour of the laboratories in the morning, which he felt sure was fully appreciated by the Governing Members. Sir Frederick Keeble seconded the adoption of the Report, which was carried unanimously.

The Balance Sheet and Accounts for the year ending 30th September, 1946, were presented by the Chairman, Mr. T. Neame, who reported that the negotiations whereby the Ministry of Agriculture took full responsibility for the finance of the research farm had been completed and took effect as from 1st October, 1945. The balance in the Research Farm account of some £6,135 would be used by the Ministry to offset the Research grant for the ensuing year. He referred to the satisfactory position of the Membership Fund, which at the end of the year 1945-46 showed a total balance in hand, including investments and property, of some £11,000. It was expected that there would be a drop in membership following the revision of the Membership Scheme, but Mr. Neame stated this had not been very serious and with the increased subscription rates an actual increase in the total of annual subscriptions could be expected. On the proposition of Mr. W. Talbot Edmonds, seconded by Mr. R. D. Wickham, the Balance Sheet and Accounts were unanimously adopted.

The auditors, Messrs J. Dix Lewis, Caesar, Duncan & Co., were re-elected for the ensuing year.

FINANCE.

A summary of the Expenditure and Receipts of the Research, Special Grants, and Experimental Farm Accounts for the year 1st October, 1946, to 30th September, 1947, is given below.

The main expenditure on the Research Account is borne by the Ministry of Agriculture, and any excess of income over expenditure is refunded to them and forms part of the block grant for the ensuing year. The position of the Experimental Farm Account is satisfactory, and the credit balance of £4,893 11s. 6d. also goes towards the Ministry's block grant to the Station for the ensuing year.

Research Account.

1st October, 1946, to 30th September, 1947.

Expenditure.	£	s.	d.	Income.	£	s.	d.
Research and Administrative Salaries	37,683	6	0	Grant from Ministry of Agriculture	47,752	15	3
Laboratory Expenses and Equipment	4,388	16	1	Grant from Ministry of Agriculture (Greenhouses)	1,316	2	11
General Maintenance Expenses	4,863	13	11	Contributions from Public Bodies	190	0	0
Adaptation and Additional Greenhouses	1,316	2	11	Contributions from Industrial Bodies, etc.	144	0	0
Balance, being excess of Income over Expenditure	1,748	9	8	Sundry Receipts	597	10	5
	£50,000	8	7		£50,000	8	7

Supplementary Accounts (Special Grants).

Expenditure.	£	s.	d.	Income.	£	s.	d.
Balance brought forward, 30th September, 1946	1,357	18	2	Mineral Deficiencies Investigations on Agricultural and Horticultural Crops	700	0	0
Salaries and General Expenses:				A.R.C.-Pettar-Ace Red Spider Investigations	465	0	0
Mineral Deficiencies Investigations on Agricultural and Horticultural Crops	397	7	3	Raspberry Investigations in Scotland	4,564	12	7
A.R.C.-Pettar-Ace Red Spider Investigations	657	11	3	Hop Propagation Experiments	482	0	10
Raspberry Investigations in Scotland	3,775	0	6	Raspberry Cane Midge Investigation	702	19	4
Hop Propagation Experiments	654	12	5	Spectrographic Investigation	697	0	0
Raspberry Cane Midge Investigation	748	4	1	Anatomical and Histological Investigations	—	—	—
Spectrographic Investigation	332	15	0	Verticillium Wilt Disease Investigations	13	19	5
Anatomical and Histological Investigations	248	5	6	Balance due from Agricultural Research Council	546	2	0
Verticillium Wilt Disease Investigations	—	—	—				
	£8,171	14	2		£8,171	14	2

Experimental Farm Account.

1st October, 1946, to 30th September, 1947.

Expenditure.	£	s.	d.	Income.	£	s.	d.
Farm Wages	22,771	17	1	Sale of Produce and Crops	37,880	19	4
Farm Manures and Sprays	1,529	13	10	Sundry Receipts	1,731	2	0
General Farm Expenses, and Repairs of Implements and Equipment	10,416	18	11				
Balance, being excess of Income over Expenditure	4,893	11	6				
	£39,612	1	4		£39,612	1	4

The East Malling Association.

The total membership on the 31st December, 1946, was 2,219, after which, under the new scheme, all memberships had to be re-registered. The revision of the scheme was well received, and by the end of June, 1947, 1,636 members had re-registered. The total on 31st December, 1947, was 1,839 and there has been a steady increase in membership since that date.

In a letter, in December, to all members the Chairman explained the decision of the Executive Committee, after discussions with the Ministry of Agriculture, to continue an annual grant towards the research expenditure. It had been agreed that the annual grant towards the Research Account should be one-third of the annual subscriptions and donations received by the Membership Fund. This is no innovation, since in the past, annual sums have been devoted from time to time towards various salaries and other expenses at the discretion of the Committee. In future, however, a contribution would be made directly to the Block grant, urgent unforeseen appointments being provided for, as agreed with the Ministry, by the inclusion in the annual estimates of a sum for contingencies. This decision of the Executive Committee has been welcomed by the majority of members, who have been glad to learn that part of their subscriptions will be applied to research projects, in addition to the more general calls on this Fund.

The Committee would again remind members that it is not the purpose of the Association to provide nursery material on any commercial scale. Every effort was made last season to meet as far as possible the requests from members, and while we appreciated the promptness with which many members sent in their applications, we were sorry that the small surplus was insufficient to meet the many orders received up to the closing date.

A copy of the Receipts and Expenditure statement for the year 1st October, 1946 to 30th September, 1947 is appended. The balance of £14,016 includes investments of £5,000 (at cost) in War Bonds and Consols and £8,792, the cost of the freehold properties Fircroft, Larkfield and The Grange, East Malling.

MEMBERSHIP FUND.

1st October, 1946, to 30th September, 1947.

EXPENDITURE.	£	s.	d.
Grant for Canteen Equipment	181	2	0
Stationery, Postages and General Expenses	388	15	5
Members' Open Day Expenses	56	2	2
Expenses and Repairs to "Fircroft" and "Fowden Hall" properties	417	13	5
Balance at 30th September, 1947	14,016	6	1
	£15,059	19	1

INCOME.	£	s.	d.
Balance at 30th September, 1946	11,191	1	7
Subscriptions and Donations ..	3,723	8	4
Interest on Investments ..	143	0	0
Sundry Receipts	2	9	2
	£15,059	19	1

MEMBERS DAYS.

It was decided to discontinue the customary single Annual Members' Day, as it was found impossible to cater or to provide a satisfactory programme for all those who wished to come. Instead it was decided to arrange several such days, each devoted to a special subject, at which not more than about 250-300 members might be expected.

There were four Members' Days during the year, when various aspects of the research in progress were demonstrated and explained to the Members.

An Amateur's Day was held on 1st March with an attendance of some 140 people, in spite of a thick carpet of snow on the ground. The morning was spent out-of-doors looking at the Bradbourne Gardens, and the afternoon was spent in the Great Hall of Bradbourne House, where a series of short talks on research topics was given.

A Cover Crops Day had been planned for 14th May, but the severe winter conditions resulted in poor growth from many of the crops, so that there was insufficient to see to justify a full day's programme. Instead, an afternoon programme was arranged and was attended by some 50 Members. Useful crops of oats and tares were seen, as well as various grass swards ; the effects of these and the difficulties experienced with other cover crops were discussed.

A Soft Fruits Day on the 4th June drew a large gathering of over 150. The day was divided between indoor talks on the diseases and pests of raspberries and strawberries and a tour of the experimental plots of these fruits. In the course of the tour propagation beds were seen and the newest methods demonstrated. In order to keep the advisory officers of the N.A.A.S. and of the Local Education Authorities up-to-date they were invited to attend a " dress rehearsal " of this on the preceding day ; some 50 officers attended and the exchange of information was found mutually helpful.

A Fruit Tree Red Spider Day was held on 12th December. The programme was in the form of talks by the workers investigating this problem followed by exhibits of apparatus and of insects predaceous on red spider. This meeting was very well attended, the small packing shed being strained to the limit to accommodate the 200 present. As in the case of the Soft Fruits Day, the advisory officers came for a dress rehearsal on the preceding day ; unfortunately no more than 30 managed to get permission in time to attend.

The usual annual Hop Open Day was held on the 29th August, with the new Wye seedling hops looking particularly well. About 40 hop growers attended, special interest being shown in those of the Wye seedlings that show resistance to Verticillium wilt and in the rapid methods of propagation under trial.

May we remind members that attendance at these Members' Days is a personal privilege of membership. Invitations cannot be extended to relatives or friends, the days being reserved strictly for Fellows, Members and Associates.

Amos Memorial Lecture.

Several friends of the late Mr. Jesse Amos, for many years Farm Manager-Recorder at the Research Station, suggested commemorating his outstanding services both to the Station and to the fruitgrowing industry generally, by forming a Fund to endow an annual public lecture on some aspect of Pomology or related fruit research ; the lecture to be known as the " Amos Memorial Lecture ", to be given by a recognized authority, and to be open freely to all those interested.

It was proposed that the lecture should usually be given at East Malling, but in special circumstances might be given in London or elsewhere. A Sub-Committee was formed, and a letter sent to all members and others who knew Mr. Jesse Amos. It was hoped to raise a sum of at least £500 which would be invested and the income used to cover the cost of lecture fees and expenses each year. We are pleased to say that a total of £451 has been subscribed to date. Subscriptions are still being received from time to time, and if any member has overlooked his donation, the Secretary of the Research Station would be very pleased to have any further sums to augment the capital money.

The first lecture is to be given at Bradbourne early in 1948.

Staff.

As forecast in the last Report, we were able to extend a warm welcome to Dr. E. E. Cheesman, who took up his duties at the beginning of May. Dr. Cheesman is already taking a large share in the administrative affairs of the Station and making his contribution to the Pomology Section's research programme.

We congratulate Dr. W. S. Rogers on the award of the degree of D.Sc. of London University in recognition of his contributions to Pomological research.

It is particularly pleasant to record a presentation to Mr. N. H. Grubb in December on behalf of the Scottish raspberry growers in recognition of his conspicuous services to the industry in breeding new varieties of raspberry.

In October, we welcomed Miss C. P. Nicoll and Miss M. H. E. Davies to the Pomology Section. Miss Nicoll will act as assistant to Mr. Garner in his propagation experiments. Miss Davies has been awarded a special grant by the Agricultural Research Council to continue the intensive studies in biennial bearing that have been in progress for some years.

In November, Mr. J. Paine joined the staff of the Plant Pathology Section. Mr. Paine, who was previously an Agricultural Officer on the Gold Coast, has had special experience in the investigation of the " swollen shoot " virus disease of cocoa. This experience will be valuable in the work on virus diseases of fruit and hops, which he is now undertaking with Dr. Prentice.

Miss T. Woolcombe, who was formerly one of our plantation assistants, joined the Section in May with a special grant from the A.R.C.

Miss J. R. Groves came to East Malling in December as assistant in the Entomology Section. Miss Groves is no stranger to the Section, having been a member of the team working at Great Braxted, Essex, on the life history and control of the Fruit Tree Red Spider Mite since 1944, except for a brief interval while she returned to Reading to complete her degree studies.

As already stated, Dr. H. Shaw resigned his appointment as head of the Plant Protective Chemistry Section in April. Dr. Shaw first came to East Malling in 1934 with a grant from the Agricultural Research Council to study, in collaboration with our biologists, chemical aspects of insecticides and fungicides. In 1942, he became head of the newly created Plant Protective Chemistry Section. Although the times were not very propitious and he himself had frequently to be absent from the Station on Committee work, during the next five years he gradually built up his Section to the considerable team that it now is. The Library Committee, of which he was Chairman, has particular reason to be grateful to him for the way he kept the Library running smoothly during the difficult wartime years, until it was possible to appoint a full time Librarian. Dr. Shaw was for several years Secretary of the Staff Council and, at the time he left, its representative on the Executive Committee. We congratulate him on his promotion to so important a post and wish him success and happiness in his new home.

We congratulate Mr. R. G. Davies on the award of an M.Sc. degree of London University.

Mr. J. T. Greaves resigned in June and Mr. L. J. Puleston was appointed in his place in October.

During Dr. Cadman's absence in New Zealand (see page 21), Dr. C. A. Wood is in charge of the Scottish Raspberry Investigation in Dundee. Mr. R. J. Rose joined the team in February.

We congratulate Miss L. R. E. Martin on obtaining the National Diploma of Horticulture in August.

Mr. D. H. Hammond resigned his appointment in March to join a commercial firm. Mr. Hammond came to the Station in 1921, working first under the late Dr. R. C. Knight, and later in the Station's nurseries. After a period of training at the Royal Botanic Garden, Edinburgh, he returned to East Malling, becoming Nursery Foreman on the retirement of Mr. Witt in 1931 and taking full charge of the large scale

experimental nurseries under the Farm Manager in 1941. He has the good wishes of all for the success of his new venture.

In February, we welcomed Mr. T. V. Dixon, who came from Wisley to fill the place vacated by Mr. Hammond.

Mr. W. F. Bond, who had been carrying out the duties of Assistant Photographer since his release from the Air Force, resigned in June and, the Ministry of Agriculture having agreed to the appointment of a fully qualified man to take charge of the Photographic Studio, we were able to welcome Mr. E. Yoxall Jones in August.

Three former laboratory assistants returned to their Sections by the end of the year after service with the armed forces. G. F. Trowell (Plant Physiology) was released from the R.A.F. in April, while R. D. Souter (Plant Pathology), after service in the Army, and E. F. Souter (Entomology), in the Navy, both returned early in 1948. We were glad to see them back again. F. J. Bellingham (Pomology) resigned in November, his place being filled by A. J. Rutter. A. G. Lloyd left the Physiology Section in February and J. Larking (Imperial College) and G. R. Evans joined the Section in January and April respectively. E. C. Wills was appointed to the Biochemistry Section in December. Miss F. J. Newing resigned from the Plant Pathology Section in March, and Miss J. M. Stevens (Plant Protective Chemistry) came in September.

J. P. Valentine left the Scottish Raspberry team in April and Miss E. C. Reoch in June. H. A. Bissett was appointed in April and R. W. Reid in May.

There were no changes in the senior members of the office staff. Miss M. M. Acott was transferred in April to the Technical Section to assist with the preparation of exhibits and other duties. Miss L. M. Godden resigned in March, Miss Y. J. Chittenden in April and Miss I. I. Thompson in November. Miss L. Sherratt was appointed in March, Miss D. G. Hume and Mrs. F. J. Fitness in May, and Miss A. V. Jell in December.

Members will note the change in title of the Bureau, which takes effect from the 1st January, 1948 (see page 9). The Bureau was strengthened by the appointment in June of Mr. A. G. G. Hill, late Director of the East African Agricultural Research Institute, Amani, to the post of Assistant Director and, in July, of Mr. G. K. G. Campbell, late of the Department of Agriculture, Nigeria, as Scientific Assistant.

On the resignation of Dr. Shaw, Mr. D. Akenhead kindly agreed to carry on temporarily the duties of Chairman of the Library Committee until a more permanent arrangement could be made. The Greenhouse Committee (Chairman, Dr. Massee), the Workshop Committee (Chairman, Mr. Villiers) and the Photographic Studio Committee (Chairman, Dr. Montgomery) have all put in good work again during the year, for which we thank them.

The responsibility for the management of the canteen, which had previously been held by a committee of members of the Staff, was transferred to the Executive Committee. Miss Wainwright took over the running of the canteen, and a small committee, representative of the staff at Bradbourne, research staff, laboratory assistants, plantation assistants and farm workers, was elected in April to assist her in an advisory and consultative capacity. This Committee (Chairman, Dr. W. S. Rogers) has met on five occasions since its formation and has given advice and made recommendations on various matters connected with the organization and running of the canteen. From March, when the change in management was made, until December, 16,818 main meals were served, a substantial increase over the same period in 1946.

Both the Cricket and Tennis Clubs showed renewed activity in 1947, the former

having the use of the Village Ground and the latter organizing some enjoyable afternoons' tennis on Mr. Tydeman's court, which he kindly loaned to the Club. The new cricket ground at Bradbourne was sown to grass, but will not be ready for play before 1949. Labour difficulties delayed the building of the new hard tennis courts, but, as we write, they are nearing completion.

Various social clubs and societies are now flourishing, these including the Play Reading Society, Swimming Club and Chess Club, while the Garden Club continues its valuable services by providing seeds, plants and fertilizers for its gardening members. Two Staff dances were held at Bradbourne.

Candidates for Higher Degrees.

Towards the end of the year Mr. P. Satyanarayana submitted a thesis entitled " The deposition and retention of certain pest control materials in relation to their biological performance " for which he was awarded a Ph.D. degree in January, 1948.

Mr. L. Bihari Singh also submitted a thesis entitled " Studies in Biennial Bearing " in December and he also was subsequently awarded a Ph.D. degree.

At the end of the year, three other postgraduate students, including one from the Imperial College, and eight members of the research staff were registered for higher degrees.

Research Students and Voluntary Workers.

In addition to those named above, Mr. J. Herrero (Pomology) and Mr. A. Prasad (Plant Physiology) came to the Station in October ; both are here for two years. Mr. C. R. Hancock, of the Imperial College, also joined the Plant Physiology Section in October.

Despite limited accommodation, we were able to welcome some twenty other workers who came here for shorter periods varying from one week to a year. While we trust that the insight they obtained into the research in progress and our particular methods was of value to them, we are not only grateful for their assistance, but well realize the benefit we gained through these contacts with both teaching and research institutes at home and in other countries.

Mr. J. R. Christensen (Argentine), British Council student, concluded his studies in March.

Mr. J. Thorsrud (Norway) came for a year's course in the Pomology Section in May.

From Sweden we had with us in the Pomology Section Mr. Karl Anjou, for three months in the summer, and Miss Gunny Larssen, the latter being of the greatest assistance to Mr. Tydeman for six months in the late summer and autumn.

From Denmark, Mr. E. Hellmers of the Royal Veterinary Agricultural College, Copenhagen, worked with Mr. Webb of the Plant Pathology Section for a month in July, while Mr. K. Johansen gave useful help to our Pomology recording staff for two months during the busy harvest season. Mr. H. Ronde Kristensen also paid us a return visit for a week in July.

Three workers were acccpted at the request of the Colonial Office. Of these, Mr. W. A. Hughes of the Gold Coast spent six months in the latter part of the year in the Pathology Section, amply repaying any experience we were able to give him by his assistance to Mr. Moore in his work on control of fungus diseases of top fruit. Mr. E. C. Diekmahns, an agricultural specialist scholar, spent six weeks in the autumn in the Physiology Section, studying technical aspects of the Avena coleoptile test. Dr. I. A. Black of the East African Agricultural Research Institute visited the Biochemistry Section for a week in October.

Miss E. J. Scott of Pretoria University, who holds a Research Fellowship at the Institute of Plant Physiology, Imperial College of Science, worked for three months in the Physiology Section, carrying out Avena tests to investigate the auxin relations in root tissue cultures.

The Biochemistry Section had the assistance of Mr. W. Lloyd for three summer months in their plant injection experiments.

Mr. I. Potapczuk of the Polish School of Gardening, Perthshire, came to obtain experience of nursery work and general propagation for a month in May and June, returning for three weeks to assist with fruit picking in the autumn. The Pomology Section also had assistance in recording from Miss E. M. Hyde-Smith of Wye College for a month in September and Mr. W. E. Kent for a fortnight in June.

Mr. N. Ream of Pembroke College, Cambridge, spent a month in the Statistics Section during the Christmas vacation gaining practical experience in the design and interpretation of experiments.

Senor F. S. Herrero, Director of the Fruit Culture Station, Logrono, continued to visit us from time to time until his return to Spain in August.

This section of the Report would not be complete without reference to Miss R. Stern and Mrs. D. M. Swithinbank to whom the Pomology Section are again indebted for valuable and experienced help during the year.

We were glad to be able to accommodate several of these workers at the Grange this year ; this gave more opportunity for getting to know them out of working hours, a special advantage in these days when private hospitality is so difficult. We thank them for their assistance and look forward to the time when it will be possible for more members of our staff to accept invitations from those who came from abroad to pay return visits to them in their own countries.

Plantation Assistants.

The scheme seems to have aroused considerable interest and we still receive more applications for inclusion in it than we can provide places for. We had the full quota of twelve assistants during the year, the first six finishing the course.

In addition to the usual work, this year the plantation assistants did the entire pruning of the Research Station and Soil Survey Plots, some framework grafting and nursery work, under instruction.

During the summer two plantation assistants, A. Ravenscroft and H. Boothman, went for three months to work at the Spangsbjerg and Blangstedgaard Research Stations in Denmark in exchange with two Danish horticultural students, O. Richter and E. Randlov. This exchange was arranged under a scheme sponsored by the Ministry of Agriculture.

During the winter and early spring, members of the Research Staff gave lectures on their special subjects, while Messrs. Painter, Preston, Eaton, Pitcher and Barlow and Miss Glenn gave short courses of lectures on various aspects of fruitgrowing, pest control and elementary science.

Of those who have completed the course, T. W. Woolcombe has joined the Plant Pathology Section ; B. Stokes and R. Cropley left to go to Reading University. J. Wickham, J. Kemp and V. Herbert are working in commercial horticulture.

Staff Discussions.

Eleven Staff Discussions were held between January and March, 1947. Ten of these dealt with the research programmes of the different Sections. The post-war programmes of each Section were described by the members of staff concerned, and a

general discussion of each programme followed. The other meeting heard a description by Dr. H. Shaw of his experiences during his tour in Germany to investigate new insecticides produced during the war by German scientists.

In December, 1947, a new series of Staff Discussions was started with a description by Mr. L. B. Singh of his two years work on Biennial Bearing. A further interesting talk was given by Dr. A. B. Beakbane, Dr. R. Hill (of the A.R.C. Unit of Biochemistry, Cambridge) and Miss E. C. Thompson on their expedition to France to study Prunus rootstocks.

Research Tours.

It has always been part of the research worker's duty to keep in touch with other workers in his subject both at home and abroad. This is best done by personal contact. Previously tours of research institutes and fruitgrowing areas have been mentioned under various headings in this Report. As communications gradually improve such occasions have become more frequent and now warrant a special section to themselves.

In June, Miss A. B. Beakbane and Miss E. C. Thompson, accompanied by Dr. R. Hill, were privileged to visit a large number of research institutes and fruitgrowing areas in France in connection with a biological expedition to study Prunus rootstocks. A short account of the expedition will be found in the Annual Report. Here, we should like to acknowledge the wonderful welcome they received and the innumerable facilities placed at their disposal. In particular, we would thank Major E. Cochois, Commercial Attache at the French Embassy in London, and M. Joffet, Director of Economic Affairs in Paris, for help in organization, without which the expedition could not have been undertaken. The party's indebtedness to M. Andre Barat, M. Souty of the Fruit Experimental Station at Pont-de-la-Maye, Gironde, and M. Suissa of Fortunon, Lafitte-sur-Lot, and many others who collaborated in making the tour such an interesting and successful one is also gratefully acknowledged.

The Pathology Section carried out several tours during the summer months. Dr. Harris, after attending the Fourth International Congress for Microbiology at Copenhagen in July, made a tour of fruit and plant pathology research and advisory centres in Denmark and Holland, with the assistance of a Ministry of Agriculture's Travelling Fellowship.

Earlier, accompanied by Dr. Prentice and also by Dr. Dicker of the Entomology Section, he toured strawberry growing areas in Cornwall to investigate the disease position at the invitation of the Western Province N.A.A.S.

Dr. Keyworth and Dr. Prentice toured the West Midland hop area in July with W. Midlands N.A.A.S. representatives and local advisers in Worcester and Hereford.

Dr. Keyworth and Miss Smith also visited the Wisbech area with Cambridge and other local N.A.A.S. officers.

Major Thompson of the Biochemistry Section made a tour in Essex to inspect cases of mineral deficiency in collaboration with the Essex N.A.A.S.

At the request of the Colonial Office, Dr. Cheesman was granted leave of absence at the end of November in order to undertake a special mission to Malaya, Sarawak and North Borneo on behalf of the Government in order to report on potentialities for the cultivation of cocoa in those countries.

About the same time, at the invitation of the New Zealand Government, Dr. Cadman, Officer-in-charge of the A.R.C. Scottish Raspberry Investigation at Dundee, left to spend four months in New Zealand, to obtain first-hand knowledge of the raspberry industry there and advise on virus disease aspects and nuclear stock schemes.

COLLABORATION.

Most of the important collaborative enterprises described in previous Reports continued during 1947, a year in which at least one outstanding research project was added to their number.

The first major report on three years' work in the Red Spider Investigations, carried on jointly, under an A.R.C. grant, with the Pettar Society and the Associated Fruitgrowers of Essex (A.C.E.), was issued at the end of the year. So encouraging were the results of the preliminary work that it was decided to continue the research for a further term of years. All parties in this venture, to whose names we must add the East Anglian Institute of Agriculture, have again contributed substantially to its success.

The A.R.C. Scottish Raspberry Investigation is so essentially collaborative that this year we cull in full from its Annual Report the section relating to its external relations, since it shows how extensive these contacts have become :—

" Close liaison has been maintained with the Plant Pathologist to the Department of Agriculture for Scotland, Dr. C. E. Foister, and with the Department's Horticultural Inspectorate. Also with our hosts, the Biology Departments of University College, Dundee, and with the Administrative and Advisory Organization of the Edinburgh and East of Scotland Agricultural College, and with the West of Scotland College of Agriculture and Glasgow University.

The development of Mr. R. D. Reid's raspberry breeding programme has been hampered by the shortage of accommodation for his material at Auchincruive, though we were glad to learn that the Department of Agriculture has recently sanctioned the lease of additional land to ensure the continuance of the work. Likewise, the limited facilities at Dundee have not yet allowed the accumulation of the data on disease reactions, etc., which Mr. Reid requires for the development of this important line of investigation.

Among the many growers who have helped us, we are indebted to Mr. J. A. Forbes, Kineff, Mr. R. S. M. Milne, Laurencekirk and Mr. D. J. Duffy, Oyne for the provision of experimental facilities and particularly to Messrs. Morrison Bros., Forfar, Mr. T. Wilson, Cupar and Mr. J. Gilchrist, Lanark for their kindly interest and generous provision of land for trial of new raspberry seedlings ; also to Messrs. Chivers & Sons, Cambridge and Montrose, Mr. David Lowe, Edinburgh, Mr. S. W. Smedley, Mr. Wm. Nairn, Blairgowrie and Mr. S. Sandison, Longforgan, for their continued active interest in the provision of experimental facilities for the work of the Investigation."

A Conference at the A.R.C. has led to the opening of a fresh series of investigations on the prevention of spring frost damage. While our part in these investigations, as described in Section II of the Annual Report, lies principally in the intensive biological studies now being developed, the Pomology Section have also collaborated with the members of the staff of the Fuel Research Station, Greenwich, in drawing up a programme for trials of orchard heaters and other devices for the prevention or mitigation of frost damage in fruit plantations. We welcome this renewed effort to find means of combating this most uncertain and difficult of all fruitgrowers' problems.

Collaboration with the Institute of Plant Physiology, Imperial College of Science, is of such long standing that we have almost come to consider as part of ourselves, the detachment of Professor Gregory's Staff who work at East Malling. Suffice it to report this year that it is still continuing, as we hope it will do for many years to come.

Turning to individual sections, Dr. Rogers reports that Mr. S. E. Arney of University College, Southampton, has made several visits to study the respiration of

strawberry plants of different ages. He also acknowledges the help of the Building Research Station who have lent us a potentiometer for thermocouple studies during freezing. Mr. Greenham also reports that collaborative work on herbage analysis in our Cover Crop Trials with the Grassland Improvement Station, Drayton, Stratford-on-Avon, has started with an exchange of visits. In the histological investigations, Dr. Davenport, a colleague of Dr. R. Hill of the A.R.C. Unit of Biochemistry, Cambridge, came here for a week in July to collect samples of apple rootstock wood for nitrogen estimations.

Dr. Vyvyan has repeated the experiment, in which he has had the help of Dr. C. West of Ditton Laboratories, on the keeping quality of apples treated with anti-drop sprays. The Physiology Section also had the assistance of the Biochemistry Department, Imperial College of Science, who carried out auxin tests for them.

The Pathology Section continued to assist the Ministry of Agriculture with their Certification Schemes for Fruit and Hops. In the Hop Diseases Investigations, the collaboration with Wye College and Long Ashton Research Station was maintained, particularly in soil studies in relation to Verticillium Wilt. In these the Statistical Section also helped, carrying out many analyses on the chemical data obtained.

Dr. Keyworth also assisted in the start of a scheme for the intensive propagation of Verticillium resistant varieties of hops by the Hops Marketing Board. Fifteen breweries are co-operating by carrying out brewing trials of these varieties.

In experiments on the control of the Strawberry Tarsonemid Mite, Dr. Massee has again collaborated with Dr. O. F. Lubatti and Mr. A. B. P. Page of the Imperial College of Science ; while Dr. Dicker has again had the help of Messrs. J. D. Campbell Ltd., in his nicotine fumigation work. Mr. Pitcher has to thank five growers in Kent, Surrey and Essex for facilities for biological work in connection with his Raspberry Cane Midge investigations. As the many new officers appointed to the research staff in recent years settle down and the work on which they are now starting develops, we anticipate that these collaborative enterprises are bound to extend. While sometimes the organization of them, particularly those carried out at a distance, is somewhat of a strain on the administration, we cannot but welcome them, since thereby the applicability of results obtained at East Malling is immeasurably widened ; while nothing but good can come of the pooling of ideas and facilities towards a common end.

Outside Trials.

As mentioned last year, projects under this heading are really an extension of those mentioned in the previous section. Apart from the need to seek the means of control for a particular disease or pest in the district in which it occurs, as often happens, the value of a trial of a rootstock or a new variety is greatly increased if it can be repeated in other localities. The grower who places his orchards at our disposal shares also in the risks just as much as he benefits by the results.

Various long term trials carried out by the Pomology Section are still in progress. These include the Fruit Soil Survey plots, in the conduct of which we are helped by officers of the N.A.A.S. and several trials listed previously on our Chairman's farms at Macknade and Newlands Throwley. The forty acres of apples on the latter farm, in four plantations designed for the study of the economics of fruitgrowing, have now been planted. While this is not strictly an experiment carried out by the Station—all the work in connection with it will be done by Mr. Neame and his staff—we are none the less greatly interested and hope to render any assistance we can as the trees grow and come into cropping. Dr. Rogers now has a cover cropping trial on Messrs. Chivers & Sons

farms at Histon. In connection with the trial of his new varieties, both of dessert apples and rootstocks, Mr. Tydeman is grateful to many growers and others, both at home and overseas, who are trying them under their own conditions. A collection of apple rootstocks is being maintained for biochemical work at the Rockefeller Field, Cambridge, the trial grounds belonging to the Botany School.

Mr. Moore and Dr. Massee conducted spraying and dusting trials on cobnuts on Mr. C. W. Neal's farm at Kingsdown and Mr. W. E. Gunyon's farm at Teston Corner. The trials reported last year on hop diseases carried out by Dr. Keyworth have been continued, and an experiment in Nettlehead at A. Guiness, Son & Co.'s farm at Bodiam added to their number. Small Verticillium Wilt trials were also started on several hop growers' farms.

In connection with the Red Spider trials in Essex, Porter's Farm, Great Braxted, where the field laboratory is situated, having changed hands, we are grateful to the new owner Mr. C. L. Brock for continuing to allow us the facilities we enjoyed there previously through the courtesy of Mr. G. Y. M. Sketch. A new experiment on the winter and summer control of the pest was started in a plantation owned by Major C. Leir of Great Totham, while Mr. J. D. Edwards, Chairman of A.C.E., Mr. R. L. Parsons, Miss Old and Mr. C. Burton all gave facilities for research in their plantations. The trial at the East Anglian Institute of Agriculture, Writtle, was also continued.

Apart from facilities already alluded to, Mr. Pitcher again used the plantations of Messrs. Barnes Bros., Lingfield, for his Raspberry Cane Midge trials.

To these and all other growers who have so generously helped us we once again extend our best thanks.

Advisory Work.

Correspondence.

The treatment of enquiries by letter has been changing during the year. As the horticultural staffs of the National Agricultural Advisory Service and of the local Education Authorities gradually got into their stride, routine problems have been either briefly replied to and then passed to them or passed directly to these advisory services. Thus although the total of enquiries received was again well over 3,000, the number replied to by our staff was only 2,800, of which some 250 were subsequently passed to the advisers for further action. It is hoped next season to reduce this number further, although there will always be many enquiries bearing directly on our research work that can be dealt with only by our own staff. This year the research workers replied personally to about 700 enquiries many of which were useful to their work, and the remaining 2,100 were dealt with by the Technical Section, with advice as necessary from the research staff. The greatest number of letters from any one county came from Kent (515), followed by Surrey (143), Essex (116) and Norfolk (39); overseas accounted for 190. Pomological problems continued to be most numerous, reaching a total of about 1,500, followed by plant pathology (271), entomology (262), plant protective chemistry (141) and biochemistry (100). Enquiries on other subjects were much less numerous, except those for publications which reached 400. Phone enquiries continue to be frequent but no record of these has been kept.

Visits.

The number of advisory visits (198) has shown no change from last year. Strictly speaking the majority of these visits were undertaken for research purposes to collect information, specimens, etc., but naturally advice is often sought by the grower on these

occasions and in so far as information is available it has been freely given. Joint visits with the advisory officers are becoming more usual and are proving most useful to all concerned.

COMMITTEE WORK AND CONFERENCES.

Many of the senior members of staff serve on outside committees and sub-committees. The list includes many set up by the Ministry of Agriculture and the Department of Agriculture for Scotland, the Agricultural Research and Improvement Councils, the National Agricultural Advisory Service and the National Fruit Trials, London University, the Royal Horticultural Society, the National Farmers' Union, the Association of Applied Biologists, the Royal Mycological Society and the Horticultural Education Association. In some of these cases additional duties are performed by certain of the staff who serve as chairman or secretary.

The Station continues to be well represented at conferences of fruitgrowers and fellow scientists, in many cases contributing papers. In addition to conferences in this country, of which possibly the most important was the meeting of the British Association for the Advancement of Science at Dundee, when Drs. Harris, Prentice and Cadman gave papers on Raspberry and Strawberry Diseases, two on the continent were attended, one at Utrecht, Holland, where Dr. Hatcher read a paper to the Society of Experimental Biologists and another at Copenhagen, Denmark, where Dr. Harris read a paper to the Fourth International Congress for Microbiology.

EXHIBITS.

This year marked the return of the Chelsea Flower Show after the war years when no show was held, and the Station contributed a popular exhibit on the use of histological and anatomical methods of predicting rootstock vigour. A much simpler exhibit was sent to Cardiff and Blackpool to show to the townsman how fruit research can affect his food supplies. An exhibit was also sent to the Tunbridge Wells Agricultural Show and another to the autumn show of the R.H.S. Exhibits of fruits in season were also staged at R.H.S. fortnightly shows. In addition, assistance was given to the advisory and educational services in the preparation of other exhibits in various parts of the country. Extensive research exhibits on hop diseases, virus diseases and fruit tree red spider were staged at a conversazione organized by the Association of Applied Biologists in London.

VISITORS.

The total number of visitors recorded during the year was 2,941. This figure includes 10 parties of overseas visitors totalling 229, and 52 parties from this country totalling 1,771. Individual visitors amounted to 941, an average of more than 3 visitors per working day, and of these 225 were from overseas.

It has been a pleasure to welcome here again many old friends who used to visit us before the war, and there is no doubt that the new acquaintances that are being made each day will be of great value to our work in the future. Parties from overseas included a further party from the Ecole Polytechnique of Paris under Professor Baranger, students from Wageningen, Holland, Indian Forest Officers from Oxford, several parties of Polish officers, a party from the Danish Growers' Association, students from Alnarp, Sweden, under Mr. Gunnar Callmar, who is well-known to many at the Station, and Ceylonese agricultural students from Monmouthshire. A party of Dutch fruitgrowers accompanied the N.F.U. Fruit Tour when they visited us in June. Parties from this country included students from colleges, farm institutes, Kew Gardens,

etc., fruitgrowers in county parties and in discussion groups, teachers, horticultural and scientific societies, as well as several more elaborately organized occasions such as the visit of the Worshipful Company of Fruiterers, the R.H.S. Fruit Group, the N.A.A.S. Fruit Specialist Officers and the N.F.U. Fruit Tour.

Members' Days brought a further 680 persons to the Station and Miss Leslie Martin, horticultural instructress of the Kent Education Committee, conducted an additional 500 visitors, mainly in 23 large parties, round the Station. Miss Martin has also conducted well attended classes in fruitgrowing for Kent school teachers, for whom there is now a special plot, planted up with a selection of fruit for training purposes.

LECTURES AND DEMONSTRATIONS.

The Advisory services have made possible a considerable reduction in the number of lectures given by members of the research staff. Of the 30 lectures given, 16 were given to audiences in Kent, of the rest 5 were given in Scotland and 1 in Eire. Demonstrations outside the Station have been largely in the hands of the official advisory officers, but Mr. Garner gave one demonstration of frameworking at the Midland Agricultural College.

A three day course in the identification of fruit tree rootstocks was arranged for the N.A.A.S. officers concerned with the rootstock certification scheme, and a one day course on hop diseases for those concerned with hop certification. These courses ensure that those who do the inspecting are up-to-date with the latest research information.

Dr. C. H. Cadman gave a talk in the B.B.C. Science Review on the Raspberry Research programme and, in addition to a short impromptu recorded talk about the work of the Station for transmission to the Empire, we co-operated with the B.B.C. in the preparation of a series of scripted discussions on Berried Fruits, Apples, Pears and Plums for transmission in Afrikaans to South Africa.

Members of staff served as judges at a number of commercial and amateur fruit shows including the Cherry and Soft Fruit Show, Maidstone, Cobdown Flower Show, Aylesford, Kent County Show, Herne Bay, the Royal Dublin Society's Autumn Fruit Show and the East Kent Show, Canterbury.

DISTRIBUTION OF ROOTSTOCKS AND EXPERIMENTAL MATERIAL.

The policy of reducing the large nurseries maintained here during the war and immediate post-war years to provide nuclear stocks for the re-establishment of the industry was continued. Thus, the stoolbed area was reduced by a further three acres after the 1946-47 harvest, so that there were fewer rootstocks for distribution, and only comparatively small quantities of other surplus material from our experimental nurseries were available to Members.

Distribution.

This was completed in good time, 954 bundles being sent by passenger rail and 174 parcels by post, also a small number of collections and road deliveries.

Overseas.

Orders from abroad for material for experimental and educational requirements were very few, partly owing to import licences and regulations, which made it increasingly difficult to supply in some areas.

Rootstocks.

Following a late start in the season due to the severe weather, we were finally able to get all layers pegged down and covered before the buds had grown out very far. This was followed by fine weather and we were able to carry out cultivation and earthing under excellent conditions resulting in a good crop of well-rooted material. Unfortunately we had our share of Aphis, resulting in extra spraying and finally the dipping of all apple and cherry rootstocks in 5 per cent. Tar Oil before distribution.

The total crop numbered 582,380, of which 222,780 were best grade, 181,000 suitable for planting up for bedded stocks for next year and 178,600 non-rooted stocks. These last can also be planted up and, with good weather conditions, should give a good return as bedded stocks.

Worked Trees.

Apart from a very few sets of high quality dessert varieties for garden purposes, which were offered to Fellows, there were insufficient surplus trees for general distribution to Members. The few trees remaining after experimental and educational needs had been met were disposed of through the Trade.

Soft Fruits.

The propagation plots of Malling Promise produced 70,000 canes, while Malling Landmark yielded 33,500. Owing to an outbreak of " Dwarf " virus disease in Landmark, it was considered advisable only to send out raspberry canes for fruiting plantations pending further research on the disease. Minor quantities of other varieties and seedlings were also supplied.

Black currants totalled 9,903 first and second grade two-year certified bushes.

The only strawberries raised at the Station for distribution now are earmarked for the establishment of special stock nurseries under the Ministry of Agriculture's scheme. For this purpose 14,000 plants of the new clone Perle de Prague M.45 were sent out, while some 4,000 Royal Sovereign M.40 and 10,000 Huxley M.44 were also supplied for new nurseries under the scheme. A new clone of Madame Lefebvre was not considered good enough for special stock purposes, and 10,000 plants were therefore distributed to the Botley Station and other experimental centres for further observation.

Bud and Graft Wood.

The Station is frequently asked to supply bud and graft wood, many different varieties being in request. The work involved in the collecting, checking, labelling and despatch of such material needs a special organization and we are unable to undertake it generally. In a few very special instances, for definite research needs, small quantities, usually of varieties unobtainable elsewhere, were supplied during the year.

STATION'S PUBLICATIONS.

Forty-one scientific papers and twenty growers' bulletins were published; the titles of these appear in the Annual Report (Section II) with summaries of those papers published in journals other than our own Annual Report. In addition, our staff has continued to assist the N.A.A.S. in the preparation of bulletins and leaflets. Bulletin 95 on Strawberries appeared during the past year, and has already run through several editions, but printing delays are still preventing the appearance of Bulletin 119 on Plums and Cherries.

Journal of Pomology and Horticultural Science.

Although the first flow of manuscript for Volume XXIII augured well for early publication, owing to the general difficulties facing both the Editors and Authors, Nos. 1 and 2 did not appear until September. Nos. 3 and 4 were similarly delayed, and it is feared that they will not be issued until the early part of the New Year.

The Joint Editors have announced several changes in the constitution of the *Journal*, starting with Volume XXIV in 1948. The title will in future be " The Journal of Horticultural Science ", and the scope will be increased to include papers of general horticultural interest; articles on fruit preservation, juices, market gardening, glasshouse crops, storage and horticultural machinery will be welcomed. It is also expected that papers will soon be received from the various new Research Stations and Departments being developed, and that when Institutes, both at home and abroad, have really got into their post-war stride, there will be a more regular flow of manuscripts.

It is hoped, with the increase in scope of the *Journal* to appeal to the widest possible horticultural audience, that there will be a corresponding increase in circulation.

For the benefit of fruitgrowers, highly technical papers will, in future, be prefaced by a brief summary.

LIBRARY COMMITTEE.

The presence throughout the year of a full time librarian became increasingly valuable.

Outstanding features in the development of the library during 1947 were:

(1) Implementation of the decision to co-operate with the Science Museum Library in their Supplementary Lending Scheme. This entailed careful checking of the entire stock of periodicals and books so that an accurate list could be forwarded to the Science Museum Library for inclusion in their union catalogue.

(2) Preparation of material in connection with the inclusion, for the first time, of the library's holdings of periodicals in the forthcoming edition of the " World List of Scientific Periodicals ". This material has now been submitted to the editors.

(3) A drive to complete the many imperfect sets of journals and reports; incomplete mainly for reasons connected with the war. The process of completing such sets entailed a voluminous correspondence, but on the whole was satisfactory, despite the disappointingly small number of German items received through H.M. Stationery Office.

Storage space now presents an urgent problem, and while temporary measures could be undertaken which would relieve the situation for a year or two, the question of provision of a permanent library of suitable dimensions requires early consideration.

The following figures may be of interest: additions to the library during the year: books, 31; bulletins, 741; bound journals, 163. From the Science Library, the National Central Library, and elsewhere 202 items were borrowed for use by members of the research staff, and 59 items were loaned to other institutions through the Science Museum Library.

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